Claims

We claim:

1. A method for converting range data of an object to a model of the object, comprising:

generating an adaptively sampled distance field from the range data; and

editing the adaptively sampled distance field to produce the model.

2. The method of claim 1 further comprising:

converting the adaptively sampled distance field to a triangle model.

3. The method of claim 1 wherein the range data includes a plurality of range images, and further comprising:

converting the range images to a plurality of range meshes in a single coordinate system; and

generating the adaptively sampled distance field from the plurality of range meshes.

4. The method of claim 3 wherein vertices of each range mesh are weighted by a probability function.

5. The method of claim 1 wherein the generating further comprises:

defining a candidate cell of the adaptively sampled distance field;

determining and storing distance values of the candidate cell in a bounded distance tree;

recursively subdividing the candidate cell into subdivided cells of the adaptively sampled distance field while determining and storing corresponding distance values of the subdivided cells in the bounded distance tree until a termination condition is reached; and

appending the distance values to the corresponding cells to generate the adaptively sampled distance field of the graphics object.

6. The method of claim 2 wherein the converting the triangle model, the adaptively sampled distance field including a plurality of surface cells storing distance values having corresponding gradients, comprising,

assigning a vertex to a center location of each surface cell,

connecting the vertices of neighboring surface cells to form triangles while satisfying a predetermined constraint, and

moving each vertex, in a single step, to a new location according to the distance value and corresponding gradient of the vertex to substantially conform the triangles to the surface of the object.